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***IN THE UNITED STATES PATENT AND TRADEMARK OFFICE***

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In re application of: JOHNSON et al.

Attorney Docket No.: INVDP001

Patent: 6,852,291

Issued: February 8, 2005

Title: HYBRID VALVE APPARATUS AND  
METHOD FOR FLUID HANDLING

Confirmation No.: 8999

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**CERTIFICATE OF EFS-WEB TRANSMISSION**

I hereby certify that this correspondence is being transmitted electronically through EFS-WEB to the Commissioner for Patents, P.O. Box 1450 Alexandria, VA 22313-1450 on July 30, 2009.

Signed: \_\_\_\_\_ /Lydie Fitzsimmons/  
Lydie Fitzsimmons

**REQUEST FOR CERTIFICATE OF CORRECTION  
OF OFFICE MISTAKE  
(35 U.S.C. §254, 37 CFR §1.322)**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450  
Attn: **Certificate of Correction**

Dear Sir:

Attached is Form PTO-1050 (Certificate of Correction) at least one copy of which is suitable for printing. The errors together with the exact page and line number where the errors are shown correctly in the application file are as follows:

**In the Specification:**

Col. 13, line 11, change "corresponding is dispensing" to --corresponding dispensing--. This appears correctly in the specification as filed on page 26, lines 14 and 15.

**In the Claims:**

Col. 17, line 10 (Claim 8), change "valve apparatus system" to -- valve system --. This appears correctly in the amendment filed June 21, 2004 (claim 8, line 1).

Col. 18, line 5, (Claim 15), change "slug from a said" to -- slug from said--. This appears correctly in the amendment filed June 21, 2004 (claim 59, paragraph 4, line 2).

Patentee hereby requests expedited issuance of the Certificate of Correction because these errors lie with the Office and because these errors are clearly disclosed in the records of the Office. As required for expedited issuance, enclosed is documentation that unequivocally supports the patentee's assertion without needing reference to the patent file wrapper.

It is noted that the above-identified errors were printing errors that apparently occurred during the printing process. Accordingly, it is believed that no fees are due in connection with the filing of this Request for Certificate of Correction. However, if it is determined that any fees are due, the Commissioner is hereby authorized to charge such fees to Deposit Account 50-4481 (Order No. INVDP001).

Respectfully submitted,  
BEYER LAW GROUP LLP

/Michael L. Louie/  
Michael L. Louie  
Registration No. 36,988

P.O. Box 1687  
Cupertino, CA 95015-1687  
408-255-8001

**PATENT**

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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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In re application of: Johnson, et al.

Attorney Docket No.: INVDP001

Application No.: 09/689,548

Examiner: Gordon, Brian R.

Filed: October 11, 2000

Group: 1743

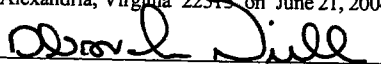
Title: HYBRID VALVE APPARATUS AND  
METHOD FOR FLUID HANDLING

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CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Commissioner for Patents, /Box Fee Amend, Alexandria, Virginia 22313 on June 21, 2004.

Signed



Deborah Neill

**AMENDMENT D**

Commissioner for Patents  
Box Fee Amend  
Alexandria, Virginia 22313

Dear Sir:

This is an Amendment in response to the Final Office Action dated February 24, 2004, and the Examiner Interview dated April 22, 2004, for the above-identified patent application.

## **IN THE SPECIFICATION**

Page 6, line 23 through page 7, line 4, please replace with the following paragraph:

In another aspect of the present invention, the manifold device may be provided by a plurality of laminated plate members which collectively define the body of the manifold. At least two plate members are fixedly mounted together in a manner cooperatively defining at least one of the aspiration conduits and the dispensing conduits. The two plate members include a first plate member having a first interface surface and a second plate member having an opposed second interface surface fixedly joined therebetween at a first interface. This first interface surface defines a plurality of first grooves which cooperate with the second interface surface of the second plate member to define at least the aspiration conduits or the dispensing conduits.

Page 19, line 21 through page 20, line 5, please replace with the following paragraph:

The incorporation of ink-jet drop-on-demand printing technology into the dispense assembly of the present invention provides significant advantages vis-a-vis known systems for printing microarrays. In particular, the ability to deliver independent, short-duration,  $[[\tau]]$  pressure pulses associated with ink-jet print valves enables the non-contact tunable delivery of reagent sample volumes in the range of about  $(10)^{10}$  to about  $(10)^{-12}$  liters. Upon application of a pressure pulse, at least one droplet of sample or reagent fluid is ejected from the manifold sample path through the corresponding nozzle member 48 onto substrate surface 26. As used herein, the term "non-contact" refers to the lack of contact between the dispense manifold and nozzles, and the target substrate during deposition. Typically, in these designs, the fluid is communicated through channels micromachined into an ink-jet style printhead - such as those commonly used in desktop and industrial printers.

## IN THE CLAIMS

Please amend claims 1-10, 14, 59 and 64-88 as follows:

1. (Currently Amended) A hydraulic hybrid valve system ~~apparatus for use with an aspiration actuator and a dispensing actuator~~ to enable transfer fluid of a liquid sample slug from a reservoir to a test site on a substrate surface comprising:

a valve assembly movable between an aspiration condition and a dispensing condition;

a communication structure having a dispensing orifice;

an aspiration actuator;

a dispensing actuator; and

a ~~single-unit fluid~~ distribution manifold device providing a ~~fluid~~ liquid aspiration conduit containing a driving liquid and having a first aspiration port for ~~fluid~~ liquid communication with the aspiration actuator, and a second aspiration port in selective ~~fluid~~ liquid communication with the valve assembly to selectively aspirate a liquid sample slug from the reservoir through said dispensing orifice of said ~~fluid~~ communication structure defining a discrete sample path containing said driving liquid and extending from the dispensing orifice and through at least a portion of said manifold device for ~~fluid~~ liquid communication with said valve assembly, when the valve assembly is in the aspiration condition, said manifold device further providing a ~~fluid~~ liquid dispensing conduit containing a driving liquid and having a first dispensing port for ~~fluid~~ liquid communication with the dispensing actuator, and a second dispensing port in selective ~~fluid~~ liquid communication with the valve assembly to selectively dispense at least one droplet of the liquid sample slug from said dispensing orifice of said communication structure when the valve assembly is in the dispensing condition,

wherein, in the aspiration condition, said sample path is out of ~~fluid~~ liquid communication with the dispensing actuator and, in the dispensing condition, said sample path is out of ~~fluid~~ liquid communication with the aspiration actuator.

2. (Currently Amended) The hybrid valve ~~apparatus~~ system as defined by claim 1, wherein

said through at least a portion of said manifold includes a primary passage portion of the sample path.

3. (Currently Amended) The hybrid valve ~~apparatus~~ system as defined by claim 2, wherein

said communication structure includes a nozzle member terminating at a said dispensing orifice configured to aspirate said sample slug and dispense said droplet.

4. (Currently Amended) The hybrid valve ~~apparatus~~ system as defined by claim 3, wherein

said primary passage portion is of a transverse cross-sectional area from about 0.2 mm<sup>2</sup> to about 0.8 mm<sup>2</sup>.

5. (Currently Amended) The hybrid valve ~~apparatus~~ system as defined by claim 2, wherein

said manifold device includes a stator face containing the second aspiration port and the second dispensing port, and said valve assembly includes a valve body having a contact face slideably contacting the stator face at a stator-contact interface for sliding sealed contact between

the aspiration condition, fluidly coupling the second aspiration port to the primary passage portion of the sample path, and

the dispensing condition, fluidly coupling the second dispensing port to the primary passage portion of the sample path.

6. (Currently Amended) The hybrid valve ~~apparatus~~ system as defined by claim 5, wherein

said contact face of the valve body includes

an aspiration channel, fluidly coupling the second aspiration port to the primary passage portion of the sample path through the aspiration channel, in the aspiration condition, and

a dispensing channel, fluidly coupling the second dispensing port to the primary passage portion of the sample path through the dispensing channel, in the dispensing condition.

7. (Currently Amended) The hybrid valve ~~apparatus~~ system as defined by claim 6, wherein

said primary passage portion of the sample path includes an upper communication port terminating at the stator face for ~~fluid~~ liquid communication with the aspiration channel in the aspiration condition, and for ~~fluid~~ liquid communication with the dispensing channel in the dispensing condition.

8. (Currently Amended) The hybrid valve ~~apparatus~~ system as defined by claim 7, wherein

said communication structure includes a nozzle member terminating at a said dispensing orifice to aspirate said sample slug and dispense said droplet.

9. (Original) The hybrid valve ~~apparatus~~ system as defined by claim 6, wherein  
at least one of said valve body and said manifold device is rotatable about a  
rotation axis extending substantially perpendicular to the stator-contact interface to  
rotate said contact face, said aspiration channel and said dispensing channel relative  
to the stator face between the aspiration condition and the dispensing condition.

10. (Original) The ~~fluid transfer apparatus~~ hybrid valve system as defined by  
claim 9, wherein

said dispensing channel and said aspiration channel extend in a direction  
substantially radially about said rotational axis.

11-13. (Canceled)

14. (Currently Amended) The ~~fluid transfer apparatus~~ hybrid valve system as  
defined by claim 1, further including:

a digitally regulated hydraulic pressure system for ~~fluid~~ liquid communication  
with the dispensing actuator for precision operation thereof.

Claims 15-58 (Canceled)



59. (Currently Amended) A method of transferring a liquid sample from a ~~fluid~~ liquid sample reservoir to a test site on a target substrate comprising:

providing a ~~single-unit fluid~~ liquid distribution manifold device defining a ~~fluid liquid~~ aspiration conduit containing a driving liquid and having a first aspiration port for ~~fluid liquid~~ communication with an aspiration actuator and a second aspiration port in ~~fluid liquid~~ communication with a valve assembly, said manifold device further defining a ~~fluid liquid~~ dispensing conduit containing a driving liquid and having a first dispensing port for ~~fluid liquid~~ communication with a dispensing actuator and a second dispensing port in ~~fluid liquid~~ communication with the valve assembly;

positioning the valve assembly in an aspiration condition, fluidly coupling the aspiration actuator to a discrete sample path extending from a dispensing orifice and through at least a primary passage portion of said manifold device for ~~fluid liquid~~ communication with said valve assembly, and fluidly decoupling the dispensing actuator from the sample path;

in said aspiration condition, actuating the aspiration actuator to aspirate a liquid sample slug from a said sample reservoir into the sample path through said dispensing orifice;

positioning the valve assembly in a dispensing condition, fluidly coupling the dispensing actuator to the sample path, and fluidly decoupling the aspiration actuator from the same path; and

in said dispensing condition, actuating the dispensing actuator to dispense at least one droplet of the liquid sample slug out of said sample path through said dispensing orifice.

60. (Previously Presented) The method according to claim 59, wherein

said primary passage portion of said manifold device having a upper communication port terminating at a stator face of the manifold, said stator face further containing the second aspiration port and the second dispensing port.

61. (Previously Presented) The method according to claim 60, wherein

said positioning the valve assembly to the aspiration condition or the dispensing condition includes slideably engaging a contact face of the valve assembly against the stator face of the manifold device at a stator-contact interface, to fluidly couple the aspiration actuator to the primary passage portion of the sample path or fluidly couple the dispensing actuator to the primary passage portion of the sample path, respectively.

62. (Previously Presented) The method according to claim 61, wherein

said slideably engaging includes rotating an aspiration channel and a dispensing channel in the contact face of the valve assembly about a rotation axis thereof, relative the stator face, to

fluidly couple the upper communication port with the second aspiration port, through the aspiration channel, in the aspiration condition, and

fluidly couple the upper communication port with the second dispensing port, through the dispensing channel, in the dispensing condition.

63. (Currently Amended) The hybrid valve ~~apparatus~~ assembly as defined by claim 3, wherein

said nozzle member having one end mounted to said manifold device and fluidly coupled to said primary passage portion.

64. (Currently Amended) The hybrid valve ~~apparatus~~ assembly as defined by claim 1, wherein

said manifold device includes a first connection region configured to enable connection of the aspiration actuator directly to the manifold device at the first aspiration port.

65. (Currently Amended) The hybrid valve ~~apparatus~~ assembly as defined by claim 64, wherein

said manifold device includes a second connection region configured to enable connection of the dispensing actuator directly to the manifold device at the first dispensing port.

66. (Currently Amended) A hybrid valve system ~~apparatus for use with an aspiration actuator and a dispensing actuator~~ to enable transfer fluid of a liquid sample slug from a reservoir to a test site on a substrate surface comprising:

a valve assembly movable between an aspiration condition and a dispensing condition;

an aspiration actuator;

a dispensing actuator; and

a manifold providing a fluid aspiration conduit having a first aspiration port for fluid communication with the aspiration actuator, and a second aspiration port in selective fluid communication with the valve assembly to selectively aspirate a the liquid sample slug from the reservoir into a discrete sample path, a primary passage portion thereof that extends through at least a portion of said manifold for fluid communication with said valve assembly, when the valve assembly is in the aspiration condition, said primary passage portion having a transverse cross-sectional area from about  $0.2 \text{ mm}^2$  to about  $0.8 \text{ mm}^2$ , said manifold further providing a fluid dispensing conduit having a first dispensing port for fluid communication with the dispensing actuator, and a second dispensing port in selective fluid communication with the valve assembly to selectively dispense at least one droplet of the liquid sample slug from the sample path when the valve assembly is in the dispensing condition,

wherein, in the aspiration condition, said sample path is out of fluid communication with the dispensing actuator and, in the dispensing condition, said sample path is out of fluid communication with the aspiration actuator.

67. (Currently Amended) The hybrid valve ~~apparatus~~ system as defined by claim 66, further including:

a nozzle member having one end fluidly coupled to said primary passage portion and an opposite end terminating at a dispensing orifice configured to dispense said droplet.

68. (Currently Amended) The hybrid valve ~~apparatus~~ system as defined by claim 67, wherein

the one end of said nozzle member being mounted to said manifold and fluidly coupled to said primary passage portion .

69. (Currently Amended) The hybrid valve ~~apparatus~~ system as defined by claim 66, wherein

said manifold includes a first connection region configured to enable connection of the aspiration actuator directly to the manifold at the first aspiration port.

70. (Currently Amended) The hybrid valve ~~apparatus~~ system as defined by claim 66, wherein

said manifold includes a second connection region configured to enable connection of the dispensing actuator directly to the manifold at the first dispensing port.

71. (Currently Amended) The hybrid valve ~~apparatus~~ system as defined by claim 66, wherein

said manifold includes a stator face containing the second aspiration port and the second dispensing port, and said valve assembly includes a valve body having a contact face slideably contacting the stator face at a stator-contact interface for sliding sealed contact between

the aspiration condition, fluidly coupling the second aspiration port to the primary passage portion of the sample path, and

the dispensing condition, fluidly coupling the second dispensing port to the primary passage portion of the sample path.

72. (Currently Amended) The hybrid valve ~~apparatus~~ system as defined by claim 71, wherein

said contact face of the valve body includes

an aspiration channel, fluidly coupling the second aspiration port to the primary passage portion of the sample path through the aspiration channel, in the aspiration condition, and

a dispensing channel, fluidly coupling the second dispensing port to the primary passage portion of the sample path through the dispensing channel, in the dispensing condition.

73. (Currently Amended) The hybrid valve ~~apparatus~~ system as defined by claim 72, wherein

said manifold includes a primary passage defining at least a portion of the sample path, and having an upper communication port terminating at the stator face

for fluid communication with the aspiration channel in the aspiration condition, and for fluid communication with the dispensing channel in the dispensing condition.

74. (Currently Amended) The hybrid valve ~~apparatus~~ system as defined by claim 73, further including:

a nozzle member having one end fluidly coupled to said primary passage and an opposite end terminating at a dispensing orifice configured to dispense said droplet.

75. (Currently Amended) The hybrid valve apparatus as defined by claim 72, wherein

at least one of said valve body and said manifold is rotatable about a rotation axis extending substantially perpendicular to the stator-contact interface to rotate said contact face, said aspiration channel and said dispensing channel relative to the stator face between the aspiration condition and the dispensing condition.

76. (Currently Amended) The ~~fluid-transfer apparatus~~ hybrid valve system as defined by claim 75, wherein

said dispensing channel and said aspiration channel extend in a direction substantially radially about said rotational axis.

77. (Currently Amended) The ~~fluid-transfer apparatus~~ hybrid valve system as defined by claim 66, further including:

a digitally regulated hydraulic pressure system for fluid communication with the dispensing actuator for precision operation thereof.

78. (Currently Amended) A hybrid valve ~~system~~ apparatus ~~for use with an aspiration actuator and a dispensing actuator~~ to transfer fluid of a liquid sample slug from a reservoir to a test site on a substrate surface comprising:

a digitally regulated hydraulic pressure system in fluid communication with the dispensing actuator for precision operation thereof;

a valve assembly movable between an aspiration condition and a dispensing condition;

an aspiration actuator;

a dispensing actuator; and

a manifold providing a fluid aspiration conduit having a first aspiration port for fluid communication with the aspiration actuator, and a second aspiration port in selective fluid communication with the valve assembly to selectively aspirate a the liquid sample slug from the reservoir into a discrete sample path, a primary passage portion thereof that extends through at least a portion of said manifold for fluid communication with said valve assembly, when the valve assembly is in the aspiration condition, said manifold device further providing a fluid dispensing conduit having a first dispensing port for fluid communication with the dispensing actuator, and a second dispensing port in selective fluid communication with the valve assembly to selectively dispense at least one droplet of the liquid sample slug from the sample path when the valve assembly is in the dispensing condition,

wherein, in the aspiration condition, said sample path is out of fluid communication with the dispensing actuator and, in the dispensing condition, said sample path is out of fluid communication with the aspiration actuator.

79. (Currently Amended) The hybrid valve ~~apparatus~~ system as defined by claim 78, further including:



a nozzle member having one end fluidly coupled to said primary passage portion and an opposite end terminating at a dispensing orifice configured to dispense said droplet.

80. (Currently Amended) The hybrid valve ~~apparatus~~ system as defined by claim 79, wherein

the one end of said nozzle member being mounted to said manifold and fluidly coupled to said primary passage portion .

81. (Currently Amended) The hybrid valve ~~apparatus~~ system as defined by claim 78, wherein

said manifold includes a first connection region configured to enable connection of the aspiration actuator directly to the manifold at the first aspiration port.

82. (Currently Amended) The hybrid valve ~~apparatus~~ system as defined by claim 78, wherein

said manifold includes a second connection region configured to enable connection of the dispensing actuator directly to the manifold at the first dispensing port.

83. (Currently Amended) The hybrid valve ~~apparatus~~ system as defined by claim 78, wherein

said manifold includes a stator face containing the second aspiration port and the second dispensing port, and said valve system includes a valve body having a

contact face slideably contacting the stator face at a stator-contact interface for sliding sealed contact between

the aspiration condition, fluidly coupling the second aspiration port to the primary passage portion of the sample path, and

the dispensing condition, fluidly coupling the second dispensing port to the primary passage portion of the sample path.

84. (Currently Amended) The hybrid valve ~~apparatus~~ system as defined by claim 83, wherein

said contact face of the valve body includes

an aspiration channel, fluidly coupling the second aspiration port to the primary passage portion of the sample path through the aspiration channel, in the aspiration condition, and

a dispensing channel, fluidly coupling the second dispensing port to the primary passage portion of the sample path through the dispensing channel, in the dispensing condition.

85. (Currently Amended) The hybrid valve ~~apparatus~~ system as defined by claim 84, wherein

said manifold includes a primary passage defining at least a portion of the sample path, and having an upper communication port terminating at the stator face for fluid communication with the aspiration channel in the aspiration condition, and for fluid communication with the dispensing channel in the dispensing condition.

86. (Currently Amended) The hybrid valve ~~apparatus~~ system as defined by claim 85, further including:

a nozzle member having one end fluidly coupled to said primary passage and an opposite end terminating at a dispensing orifice configured to dispense said droplet.

87. (Currently Amended) The hybrid valve ~~apparatus~~ system as defined by claim 84, wherein

at least one of said valve body and said manifold is rotatable about a rotation axis extending substantially perpendicular to the stator-contact interface to rotate said contact face, said aspiration channel and said dispensing channel relative to the stator face between the aspiration condition and the dispensing condition.

88. (Currently Amended) The ~~fluid transfer apparatus~~ hybrid valve system as defined by claim 87, wherein

said dispensing channel and said aspiration channel extend in a direction substantially radially about said rotational axis.

89. (Previously Presented) The method according to claim 59, wherein

said primary passage portion having a transverse cross-sectional area from about  $0.2 \text{ mm}^2$  to about  $0.8 \text{ mm}^2$ .

90. (Previously Presented) The method according to claim 59, further including:

digitally regulated the hydraulic pressure of the dispensing actuator for precision operation thereof.

### ***REMARKS***

The Applicant respectfully requests reconsideration of the objections and rejections set forth in the Final Office Action dated February 24, 2004, and the Examiner Interview dated April 22, 2004, for the above-identified patent application.

#### ***The Rejection under 35 U.S.C §112:***

Claims 1-3, 5, 6, 66 and 78 stand rejected over 35 USC §112, second paragraph, as being indefinite for the reasons set forth in the Office Action. The Applicants have amended these claims in the manner suggested by the Examiner. Specifically, the communication structure, the aspiration actuator and dispensing actuator are now positively claimed.

Moreover, regarding the concern that the claimed invention would no longer constitute a valve, the Applicants respectfully disagree, but nonetheless have amended the preamble to be “A hydraulic hybrid valve system to enable transfer of a liquid sample slug from a reservoir to a test site on a substrate surface”. Hence, it is now a valve system including a valve that enables liquid manipulation. Accordingly, withdrawal of the §112 rejection is respectfully requested.

#### ***The Rejection under 35 U.S.C §102(b):***

The Examiner has rejected claims 1-3, 59 and 63-65 under 35 USC §102(b) as being anticipated by new reference Kenny, U.S. Patent No. 4,461,328. In view of the above-indicated amendments and the forgoing remarks, the Applicants respectfully disagree.

Briefly, exemplary claim 1 now recites a hydraulic hybrid valve system to enable transfer of a liquid sample slug from a reservoir to a test site on a substrate surface. The valve system includes a communication structure having a dispensing

orifice; an aspiration actuator; a dispensing actuator; and a valve assembly movable between an aspiration condition and a dispensing condition. The valve system further includes a distribution manifold device providing a liquid aspiration conduit containing a driving liquid and having a first aspiration port and a second aspiration port. The first aspiration port is configured for liquid communication with the aspiration actuator, while the second aspiration port is in selective liquid communication with the valve assembly to selectively aspirate a liquid sample slug from the reservoir through the dispensing orifice of the communication structure. A discrete sample path is defined containing the driving liquid and extending from the dispensing orifice of the communication structure and through at least a portion of the manifold device for liquid communication with the valve assembly. When the valve assembly is in the aspiration condition, the manifold device further provides a liquid dispensing conduit containing a driving liquid and having a first dispensing port for liquid communication with the dispensing actuator, and a second dispensing port in selective liquid communication with the valve assembly to selectively dispense at least one droplet of the liquid sample slug from the dispensing orifice of the communication structure when the valve assembly is in the dispensing condition. In the aspiration condition, the sample path is out of liquid communication with the dispensing actuator and, in the dispensing condition, the sample path is out of liquid communication with the aspiration actuator.

Accordingly, the present invention provides a complete hydraulic hybrid valve system that enables aspiration into and precision dispensing of the liquid sample from dispensing orifice in minute or micro volumes. By containing a driving liquid in both the aspiration conduit and the dispensing conduit, a near liquid-to-liquid interface is created between the driving liquid and the sample liquid slug, forming a hydraulically

driven system that permits precision fluid aspirating and dispensing. As set forth in the present pending application at page 25, lines 11-12:

[The] mobile phase fluid 85, 86 [is] supplied to the aspiration actuators 21 and the dispensing actuators 22 as a driving fluid.

Since this hydraulic arrangement is nearly a liquid-to-liquid interface, as opposed to the air-to-liquid interface of the cited references, there is no air compression. Hence, the pressure pulse caused by the aspirating and dispensing actuators can be easily transferred across the interface between the driving liquid to the sample slug contained in the sample path. Consequently, amongst other factors, the aspiration and dispensing energy output by the actuators can be concentrated on the aspiration and dispensing procedures to aspirate and dispense precise amounts in very minute quantities. In other words, due to the combination of the hydraulic configuration and the precision actuators, the present invention has:

the ability to deliver independent, short-duration, pressure pulses associated with ink-jet print valves enables the non-contact tunable delivery of reagent sample volumes in the range of about  $(10)^{10}$  to about  $(10)^{-12}$  liters.

Kenny, in contrast, discloses a multi-component pipetting device aspirating into a well of the conical pipetting tube 4 of a tray 3. Referring to the embodiment of FIGURES 5 and 6, a pipette device 2 is removably mounted to tray 3 that provides an interconnection 36 mounted to one end of a flexible hose 38. The other end of the flexible hose is coupled to valve 52, which in turn is connected through flexible lines 54 and 56 to a pressure source and a vacuum source, respectively. A hydrophobic filter sheet 20 (col. 2, lines 18-22 and 61-60) is disposed over the wells of the pipetting tubes 4, separating them from the cavity formed by the top plate 30 and the plate 27. Accordingly, the device of Kenny can only dispense aqueous (non-hydraulic) fluids since a non-aqueous fluid flowing through the hydrophobic filter

would damage it. Moreover, a dispensing gas must be employed on the other side of the filter to drive the process and permit the passage of gas (col. 2, lines 30-32), as opposed to utilizing a hydraulic driving means, such as the driving liquid of the present invention.

Accordingly, since Kenney is only for a non-hydraulic (air/liquid dispensing) driving application, the volumes of sample aspirated and dispensed cannot be accurately controlled. This is due in part to the fact that using a compressive gas as a driving fluid, the gas compresses and expands, and thus cannot accurately aspirate and dispense liquids.

Moreover, the hydrophobic design of Kenny requires that the volumes of sample aspirated into and dispensed from the wells of the tubes 4 are thus fixed (col. 2, lines 62-67). The aqueous fluid is drawn into the wells of the tubes 4 until it reaches the hydrophobic filter sheets 20 "which stops the upward movement of liquid in the tubes" (*Id.* at lines 64-65). An exact predetermined amount of liquid is thus contained, since otherwise you cannot determine the amount aspirated or dispensed in this device (*Id.* at lines 65-67). Consequently, the arrangement of Kenny is not conducive for accurate, non-contact aspiration and dispensing in variable volumes since the compressive gas driving fluid is not capable of drop ejection in an accurate, reproducible manner.

The present invention, by comparison, is capable of complete hydraulic aspiration and dispensing, and in variable, reproducible amounts at very low volumes. Since the hydraulic application of the present invention employs driving fluids for aspiration and dispensing (Page 25, lines 10-20 of the present pending application), there is substantially nil volume of compression or expansion at the interface, allowing energy transfer there across that is directly transferred to the aspirated or dispensed sample.

The importance of this is that, unlike the non-hydraulic device of Kenney, accurate, reproducible dispensing can be performed, as well as delivering variable volume dispensing of non-aqueous fluids chemicals.

The device of Kenny also cannot dispense fluids of varying viscosities from the multiple wells since the gas pressure will typically cause the less viscous fluids to be dispensed first (i.e., less resistance) therefrom. Once the first well is empty, the gas will then all pass through that empty well and not dispense anymore fluids from the other wells.

The present invention, of course, is capable of allowing discrete on/off functionality, and can open one channel while the other is completely off. Hence, not only can variable volumes can be dispensed simultaneously, but the present invention can also simultaneously dispense fluids of different viscosities.

In view of the foregoing arguments and amendments, withdrawal of the §102 rejections is respectfully requested.

**The Rejection under 35 U.S.C §103(b):**

The Examiner has rejected claims 5-10 and 62-65 under 35 USC §103(a) as being unpatentable over Kenny, and further in view of Naono. In view of the above-indicated amendments and the forgoing remarks, the Applicants respectfully disagree.

Naono discloses a complex, multiple component device that is hydraulically driven by applying multiple valves to perform the functionality of the present invention. Accordingly, the applicant submits that it would be improper to combine the Non-Hydraulic device of Kenny with the Hydraulic driven device of Naono. Also, rotary-type switching valves of Naono do not function properly unless Hydraulically driven, and Naono discloses a flow through application as opposed to an aspirate/dispense model, as the present invention suggests. Hence, even if the



combination of Kenny and Naono could be combined, the arrangement would still be an aqueous only device, and would still be a fixed volume aspiration/dispensing system incapable of accurate fluid deliver in reproducible and minute amounts..

In view of the foregoing arguments and amendments, withdrawal of the §103(a) rejection is respectfully requested.

### *Conclusion*

In light of the above amendments and remarks, the Applicants respectfully request that the Examiner reconsider this application with a view towards allowance. It is believed that all claims now pending and all Currently Amended claims fully and patently define the subject invention over the cited art of record and are in condition for allowance.

If the Examiner has any questions concerning this case, the Examiner is respectfully requested to contact Michael L. Louie at (510) 843-6200.

The Commissioner is hereby authorized to charge any additional fees, including any extension fees, which may be required or credit any overpayment directly to the account of the undersigned, No. 50-0388 (Order No. INVDP001).

Respectfully submitted,

BEYER WEAVER & THOMAS, LLP

By Michael Louie  
Michael L. Louie  
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Subsequently, the transport mechanism can move the hybrid valve assembly 27 to the test sites 25, while the electric motor 56 and drive train 54 rotates the rotor element 52 from the aspiration condition to the dispensing condition. As mentioned, the aspiration channels 57 in the rotor face 51 are moved out of fluid coupling to the upper communication ports 46 of the primary passages 45, while the dispensing channels 58 in the rotor face 51 are moved to fluidly couple the second dispensing ports 37 of the dispensing conduits 35 with the corresponding communication ports 46. Essentially, in the aspiration condition, the second dispensing port 37 of the dispensing conduit 35 is dead-ended against the rotor face 51, while in the dispensing position, the second aspiration port 32 of the aspiration conduit 30 is dead-ended against the rotor face 51.

The mobile phase fluid, which is preferably substantially similar to that supplied to the aspiration actuators, is fluidly coupled to the corresponding dispensing channels 58 in the rotor face 51 to selectively dispense the sample fluids from the corresponding nozzle tips 81. Accordingly, cross-contamination is minimized to the mobile phase fluids contained in the corresponding dispensing channels 58. This assures that the dispensing conduits 35 can be substantially maintained free of contamination of any sample or reagent fluids.

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In an alternative embodiment of the present invention, the nozzle passages 50 and corresponding primary passages 45 may only be employed to dispense the sample or reagent fluid from the sample path 33. Unlike the embodiment above-mentioned, the nozzle member 48, thus, will not be utilized to aspirate the targeted fluid into the sample path from the source plate. Accordingly, as viewed in the embodiments of FIGURES 15 and 17, the hybrid valve assembly can load the sample path 33 through means other than the nozzle members 48, while maintaining the isolation of the sample path from the dispensing actuator, in the aspiration condition (FIGURES 15 and 17), and isolation of the sample

## UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

Page 1 of 1

PATENT NO. : 6,852,291  
APPLICATION NO. : 09/689,548  
ISSUE DATE : February 8, 2005  
INVENTOR(S) : JOHNSON et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

**In the Specification:**

Col. 13, line 11, change "corresponding is dispensing" to --corresponding dispensing--.

**In the Claims:**

Col. 17, line 10 (Claim 8), change "valve apparatus system" to -- valve system--.

Col. 18, line 5, (Claim 15), change "slug from a said" to -- slug from said--.

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